

International Energy Biweekly Review

9 August 1978

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INTERNATIONAL ENERGY BIWEEKLY REVIEW

9 August 1978

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While its basic financial strength remains enormous, Saudi Arabia is encountering temporary cash flow problems triggered by [REDACTED] reduced oil output. The government probably is reluctant to increase oil exports and revenues by relaxing operating restrictions on Aramco.

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The risk of global stringencies remains high for the first half of the 1980s, with both the willingness and the ability of key OPEC suppliers to meet expanding world demand coming increasingly into question.

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Cairo's favorable approach toward foreign oil company operations in Egypt—a reflection of its dependence on foreign expertise, equipment, and financing—appears to be paying off through new oil discoveries and increased oil production.

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OPEC members are expected to borrow at least \$13 billion in 1978, about double the amount obtained in 1977.

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INTERNATIONAL ENERGY BIWEEKLY REVIEW

Overview

Saudi Arabia is encountering temporary cash flow problems triggered by the reduced volume of oil exports, which is holding revenues well below the amounts used by the Finance Ministry for budget planning. The US Liaison Office in Riyadh estimates that a budget deficit as high as \$5 billion could develop this fiscal year (beginning 1 June 1978) if oil prices do not rise. If, as we expect, OPEC decides on a price hike effective in January, revenues will be somewhat higher than envisioned in this calculation, but Saudi Arabia is still likely to run a deficit for the year. With its \$60 billion in foreign assets, however, Saudi Arabia remains exceedingly strong financially.

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Aramco production, however, is now down to 7.3 million b/d, in part because of a limitation on exports of light crude imposed by the Oil Ministry.

The Saudi Government is using the proceeds of maturing foreign securities to cover operating expenses. Facing the prospects of constant or declining revenues in 1978-79, the Council of Ministers in mid-June 1978 ordered a one-third cutback in government expenditures programmed for the new fiscal year. Even with this cut, a deficit is still likely because of reduced oil output.

The precise impact of the June cutback on the economic development program is hard to assess. Many ministers are dragging their feet on specifying what will be deleted or deferred from the earlier plan. In the meantime as ministries reassess priorities, projects hang in limbo, funds are frozen, and a mood of uncertainty prevails among advisers and contractors.

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Note: Comments and queries regarding this publication are welcome. They may be directed to [REDACTED] of the Office of Economic Research, telephone [REDACTED]

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Despite continued cash flow constraints, the Saudis do not appear willing to relax regulations which impede oil output. Recent evidence signals a further tightening of the rules imposed on Aramco, the implication being that the Saudis attach considerable importance to these production restrictions.

Current operating restrictions have caused Saudi output to fall below the total volume that the shareholder companies of Aramco would prefer to purchase. The shortfall is particularly acute in the case of Saudi light, and the companies have increased purchases of light crudes from other suppliers.

Aramco production in first half 1978 averaged 7.6 million b/d, some 11 percent below the combined average of the two preceding years. Two of the shareholder companies are forecasting Aramco's second half 1978 output at 7.3 million and 7.5 million b/d. Although both companies expect a price increase of 10 percent or more by yearend, neither expects the Saudis to permit a fourth quarter surge in production. Other OPEC countries are, therefore, likely to be the beneficiaries of any fourth quarter increase in demand in anticipation of higher prices. (Confidential Noform Nocontract)

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THE OIL MARKET THROUGH 1985

Scope and Limitations

This article analyzes the prospects for the international oil market during the next seven years.* It is designed to identify the circumstances under which demand pressure on available oil supply may push up oil prices and to evaluate how likely these circumstances are to occur, not to work out the ways in which a potential problem may be resolved.

The analysis is complex, because it depends on the interaction of projections of three key variables—economic growth in the industrialized countries, the effectiveness of energy conservation efforts, and oil production. Moreover, projections are inherently uncertain. They depend on historical data, which are subject to various interpretations, and on future events that are unpredictable.

Because of the critical role of the OPEC countries in supplying world oil needs, the analysis is organized in terms of the demand for OPEC oil and the willingness and ability of the OPEC countries to meet this demand. To simplify the problem, we have limited the analysis in three ways:

- OPEC prices are held constant in real terms.
- We do not consider the impact of possible changes in the energy policies of the industrialized countries.
- We consider only the period through 1985—a period short enough so that lead times for planning and implementing major projects are important constraints on the expansion of oil production capacity.

In practice, of course, if energy demand began to put pressure on oil supply, real oil prices would increase and government policies probably would change. Price increases would lower the demand for oil both directly and through their depressing effect on economic growth. Governments probably would take increasingly vigorous steps to conserve energy and to increase supplies.

* This article summarizes a forthcoming report of the Office of Economic Research, *The Oil Market Through 1985*. This report updates and extends the analysis in ER 77-10240, *The International Energy Situation: Outlook to 1985*, April 1977.

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Within this analytical framework, we have established the following ranges as the probable parameters for the key variables:

- Real economic growth in the OECD countries averaging from 3.7 percent to 4.2 percent annually during 1978-85.
- Energy conservation in response to past price increases and existing government policies holding the growth of OECD energy demand to between 70 percent and 80 percent of the rate of economic growth.
- Oil production in the OPEC countries rising from 31.7 million barrels per day (b/d) in 1977 to between 33 million b/d and 40 million b/d in 1985.

Oil Supply and Demand Through 1985

Our April 1977 study concluded: "In the absence of greatly increased energy conservation, projected world demand for oil will approach productive capacity by the early 1980s and . . . prices will rise sharply to ration available supplies." A number of factors have changed in the past year. Most importantly, evidence is mounting that OPEC, especially Saudi Arabian, productive capacity is not likely to reach the level predicted earlier—in part because OPEC governments, which are assuming an increasing role in key decisions, have different objectives than previous corporate owners. On the demand side, economic growth in the developed countries in 1977-78 seems likely to average about a half a percentage point less a year than anticipated in April 1977, moderating projections of future oil demand. In addition, we have lowered our projections of Communist area maximum net oil imports in 1985, primarily to reflect Soviet and East European hard currency constraints.

Taking all these changes into account, the risk of oil stringencies in the first half of the 1980s—leading to large increases in the real price of OPEC oil—still appears high. Alternative combinations of projections of the three key variables produce a range of several years during which such a problem might first arise:

- If OPEC supplies expand only to 33 million b/d and economic growth rates average 4.2 percent annually, there could be an oil problem as early as 1980.
- Even with OPEC production of 40 million b/d, which we believe to be optimistic, demand for OPEC oil would catch up with supply before 1985 if the rate of economic growth is at the high end of our range.

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- A combination of high OPEC supply, low economic growth, and stringent conservation would avoid a problem at least through 1985.

Our judgment about the imminence of a problem is not shared by all oil forecasters. Most projections of energy demand and of domestic energy output in the OECD countries are similar to ours. Few other forecasters have allowed for the possibility that the Communist countries would become net importers of oil, but this difference is not critical to our estimate. If the Communist countries somehow were able to avoid any net oil imports, the projected arrival of demand pressure on oil supplies would be postponed only for about one year. The key difference centers on OPEC supply. The most optimistic forecasters assume OPEC, especially Saudi, productive capacity well in excess of what we consider to be within the range of probable outcomes, although some have lowered their projections in the past year and some of the recent projections are close to our own.

The OPEC Role

We believe that both the willingness and the ability of OPEC countries to supply continually growing oil demand are increasingly doubtful. The expansion of OPEC productive capacity in the next several years is likely to be constrained by the political and economic policies of key producing countries, as well as by technical considerations. Some of the oil-exporting countries, which now control their own resource development, have longer time horizons than the international oil companies. Those with surplus revenue have the options of limiting production to less than existing capacity or holding back on the installation of new capacity. The incentive to restrict oil production may emanate from conservationist concerns about optimizing ultimate oil recovery. Programs to expand productive capacity also may be deliberately delayed or expedited—for foreign policy reasons.

Several key OPEC governments already have taken steps that have lowered oil production and limited investments in the expansion of productive capacity. Saudi Arabia and Abu Dhabi have placed production ceilings on specific oilfields and types of crude oil and have imposed operating restrictions on the oil companies.

Saudi Arabia—The Swing Factor

Saudi Arabia, the major producer of increasing amounts of oil for world markets in the last decade, holds the key to OPEC's ability to meet growth in oil demand in the 1980s. The outlook for expansion of Saudi oil productive capacity has worsened considerably during the past year. Aramco, the company responsible for almost all oil production from Saudi Arabia, planned early last year to raise sustainable capacity to

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16 million b/d by 1985. That plan was never approved by the Saudis, and it no longer appears to be a feasible goal. The Saudis have placed production ceilings on specific oilfields and on types of crude oil, have imposed operating restrictions on the oil companies, and have limited the funds available to Aramco for investment. In its most recent plans, Aramco has scaled down its expectations to only 11.5 million b/d by 1983.

We believe that sustained production for all of Saudi Arabia of 12.5 million b/d (the figure used in our high projection of OPEC output) could be reached by 1985, given a combination of massive new investments and some relaxation of production restrictions imposed by the Saudis. Reaching this level, however, probably would require pushing some major Saudi oilfields close to their reasonable production limits, as well as timely approval of major investments with lengthy lead times. By contrast, strict adherence to the rules now in force would push Saudi output below the present maximum allowable production level of 8.8 million b/d (the figure used in our low projection of OPEC output).

From the point of view of narrow economic self-interest, the Saudis may believe they have little to gain from an expensive expansion program that would carry an element of risk. Most senior Saudi oil policymakers strongly favor limiting not only output but future capacity. They believe that oil in the ground is the best form of savings and do not want to be in a position of being subjected to outside pressure to produce at higher levels than they consider desirable. Conservationist concerns are bolstered by the opinion of some that miscalculations on safe production levels could lead to a permanent loss of reserves. Although substantial excess capacity provides leverage over OPEC decisions, the Saudis recognize that large additions to capacity would be eaten up by increased world oil demand. Hence, strong foreign policy considerations probably would have to be invoked to convince the Saudis to make the series of affirmative decisions necessary to reach even 12.5 million b/d sustainable capacity by 1985. On balance, we believe that Saudi production of about 10.5 million b/d (the figure used in our middle projection of OPEC supply in 1985) is a more likely outcome.

Elsewhere in OPEC

As for the rest of OPEC, the chances of substantial increases in oil production are small. With its effort to install huge amounts of new equipment lagging, Iran will see its sustainable capacity decline by the mid-1980s, from its current 6.5 million b/d to somewhere between 5 million and 6 million b/d. Iraq should be able to expand crude capacity somewhat, although Baghdad's plans for future output have been scaled down several times since 1973. Conservationist views in Kuwait and Abu Dhabi point

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against the lifting of their current production ceilings. Nigeria, Venezuela, and Indonesia will do well to maintain current output.

The Communist Countries

Energy production prospects for the Communist countries have not changed significantly since our last paper. We projected a decline in Soviet oil production during 1981-85 to a maximum of 10 million b/d—a level that may meet Soviet domestic requirements but would not leave a surplus for export. Since China will probably continue to export only small amounts of oil and most other Communist countries will run large and growing oil deficits, we still expect the Communist countries as a group to shift from a net oil export to a net oil import position.

How much they will import by 1985, however, is highly uncertain. Their potential demand will depend on economic growth and conservation. Moreover, they will have to allocate their limited hard currency earnings between oil imports and other high-priority imports. They probably will not be able to afford to buy all the oil they would want if economic growth were the only consideration. The Communist countries as a group were net exporters of 1.1 million b/d of oil in 1977. Taking into account their economic outlook, the prospects for energy conservation and for substitution of other energy sources for oil, and potential hard currency earnings, we believe that the USSR, Eastern Europe, Cuba, and the small Soviet client states in the Far East will import as much as 3.0 million b/d of oil by 1985 if the real price of oil remains constant. China probably will export about 500,000 b/d, reducing the net import balance for the Communist countries as a group to some 2.5 million b/d.*

Although most of these imports would be for Eastern Europe and Cuba, Moscow would have to assist with financing, since the East Europeans and Cubans could not pay for their own oil needs without incurring severe economic problems. Thus, both the USSR and Eastern Europe probably will have to reduce non-oil imports from hard currency countries to pay for oil imports.

* In our April 1977 paper, we projected maximum Soviet oil production in 1985 of 10 million b/d, minimum import requirements for the USSR and Eastern Europe of 3.5 million b/d, and negligible Chinese exports. In the current paper, projected Soviet production is unchanged. The net import figure for the USSR and Eastern Europe has been revised downward to 2.7 million b/d; the 800,000-b/d change reflects our expectations of an additional 700,000 b/d in fuel conservation in the USSR, as well as minor changes in economic growth projections and conservation estimates for Eastern Europe accounting for the remaining 100,000 b/d. Our current projection is that China will be a net exporter of some 500,000 b/d by 1985. Moreover, this paper makes explicit allowance for net imports by Cuba and other Communist countries of 300,000 b/d by 1985 to arrive at a balance of 2.5 million b/d for all Communist countries. A further difference stems from the fact that the April 1977 paper assumed that if Soviet oil production fell short of 10 million b/d, Soviet and East European imports could go as high as 4.5 million b/d. We currently believe that Soviet and East European imports of about 2.7 million b/d are the maximum possible, given hard currency constraints and that any reduction of Soviet production below 10 million b/d would not be covered by additional imports but rather would be absorbed by reductions in economic growth in the USSR and Eastern Europe.

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Accordingly, it is clear that Moscow faces an oil problem that will be difficult to solve and must make very painful policy choices. These involve tradeoffs between how much to reduce its non-oil imports from the West to make room for oil imports in its hard currency payments, how much of the burden to assume in order to help Cuba and Eastern Europe, and how much to curtail economic growth in the USSR and Eastern Europe in order to hold down energy consumption and imports.

Other Oil Producers

The growth of available oil supplies outside of OPEC also is expected to slow during the period of this assessment. After approximately tripling in 1978-80 to 2.9 million b/d, North Sea production will likely only rise another 1.4 million b/d by 1985. Output in the United States will likely hold steady in 1980-85; after the first upsurge of Alaskan oil, increments from the North Slope will just about offset declines in production elsewhere. Mexico will be an important source of new oil, with production likely to grow from 1.1 million b/d last year to 3.9 million b/d in 1985, if the expansionist plans of the present government are continued. Most other less developed countries have been searching intensely for oil but their overall net imports still are likely to rise.

Alternative Energy Sources—No Panacea

The development and use of non-oil energy sources are unlikely to offset the slowdown in oil supply growth, although there is considerable uncertainty as to what is achievable for coal and natural gas. This assessment assumes a 25-percent increase of coal production in industrial countries—almost entirely reflecting a 40-percent increase in the United States—between 1977 and 1985. Further increases in coal usage in developed countries will be constrained by (a) high production costs in some countries, (b) inadequate infrastructure, and (c) insufficient incentives to induce industry and public utilities to convert from oil or gas to coal.

Nuclear power probably will more than double its share of OECD energy production in 1978-85, to 11 percent. Additional gains in this time frame are largely precluded by multiyear lead times that are being added to by increasing political and legal pressures in many industrial countries. Production of natural gas in the developed countries may decline somewhat, but a sizable rise in imports of natural gas and liquefied natural gas—mostly from OPEC members—should allow some increase in gas consumption by industrial countries. As for other energy sources, the potential of hydroelectric and geothermal power is limited by the availability of resources suitable for exploitation, long lead times, and the currently high costs. Existing solar techniques that are cost effective at present prices—construction of buildings to make

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the best use of sunlight and use of solar energy for hot water heating—probably will continue to be introduced slowly.

Implications for Economic Growth

Most developed countries face a difficult transition to lesser reliance on oil even if conservation efforts lead to a continuing steady decline in the relationship between energy use and GNP in the OECD countries in 1977-85. If energy demand grows about 80 percent as fast as GNP, economic growth rates of even 3.7 percent a year in the OECD would carry a high risk of oil market stringencies before 1985. This would push up oil prices and subsequently lead to a reduction in economic growth.

Higher conservation would postpone the problem only briefly. Under most combinations of supply and demand, any change that reduced OECD energy demand about 2.5 percent by 1985,* and held the growth of energy demand to only 70 percent of the rate of economic growth, would have the effect of postponing market stringencies for a year or so. Conservation even at that rate still results in market stringencies before 1985 unless OPEC production is at the high end of our range.

Political and social pressures in the oil-consuming countries in most cases appear to be at cross-purposes with developments that would reduce potential oil market stringencies by 1985. With unemployment at more than 16 million almost three years after the last recession, OECD governments are under severe pressure to stimulate economic growth. A cluster of national elections scheduled in 1980 and 1981 will reinforce the desire to reflate. While the threshold of public tolerance for unemployment is uncertain, it is doubtful whether many electorates would accept the reality of fewer jobs in the short run to avoid a dimly perceived, oil-induced, economic slowdown a year or more in the future.

Meanwhile, a number of factors impede public, and in some cases governmental, recognition of an impending oil problem. Most importantly, there is now a glut on the oil market due to the new flows of North Sea and Alaskan oil at a time of relatively sluggish demand. In addition, the US and European coal industries have substantial excess capacity, in part due to slumping world steel demand. Such conditions will disappear if moderate economic growth continues for the next two years, but they delay the adoption of stronger energy conservation policies as well as changes in lifestyles. In many countries the sluggish pace of investment also postpones the introduction of more energy-efficient production methods and machines.

* This is, for example, the approximate impact of energy legislation now pending in Congress, according to Department of Energy estimates.

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Scenarios of World Demand for OPEC Oil
 (Constant Price of OPEC Oil)

Supply Exceeds Demand <input type="checkbox"/>								
Ex Ante Demand Exceeds Supply <input type="checkbox"/>								
OECD Real GNP Growth 3.7 Percent ¹								
Supply Scenarios	1978	1979	1980	1981	1982	1983	1984	1985
High OPEC Supply	+	+	+	+	+	+	+	+
Medium OPEC Supply	+	+	+	+	+	+	+	+
Low OPEC Supply	+	+	+	+	+	+	+	+
OECD Real GNP Growth 4.2 Percent ¹								
High OPEC Supply	+	+	+	+	+	+	+	+
Medium OPEC Supply	+	+	+	+	+	+	+	+
Low OPEC Supply	+	+	+	+	+	+	+	+

World Demand for OPEC Oil Allowing for Additional Conservation ²								
Supply Exceeds Demand <input type="checkbox"/>								
Ex Ante Demand Exceeds Supply <input type="checkbox"/>								
OECD Real GNP Growth 3.7 Percent ¹								
Supply Scenarios	1978	1979	1980	1981	1982	1983	1984	1985
High OPEC Supply	+	+	+	+	+	+	+	+
Medium OPEC Supply	+	+	+	+	+	+	+	+
Low OPEC Supply	+	+	+	+	+	+	+	+
OECD Real GNP Growth 4.2 Percent ¹								
High OPEC Supply	+	+	+	+	+	+	+	+
Medium OPEC Supply	+	+	+	+	+	+	+	+
Low OPEC Supply	+	+	+	+	+	+	+	+

1. These growth rates were calculated from projections of specific age population trends, projections of participation rates, and the use of historic GNP to employment relationships. They imply constant OECD unemployment assuming the historic relationship between employment and GNP growth (OECD average 4.2 percent) or, alternatively, constant unemployment assuming a decline in the historic relationship of productivity to GNP growth (OECD average 3.7 percent).
2. World energy demand adjusted for a 2.5 percent reduction in OECD energy demand in 1985; amounts rising linearly to this level in 1985. This would be the approximate effect of energy legislation now pending in Congress, according to Department of Energy estimates.

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Plausible Adjustment Paths

The future oil problem may not take the form of a large, rapid runup in prices such as occurred in 1973 and 1974. If it did, the impact on economic growth, unemployment, and inflation in the industrial countries would again be traumatic. We calculate that an oil price increase of 10 percent now has the same economic impact as a 60-percent increase in 1973, when the weight of oil in economic activity was much smaller. Every 10-percent rise in real crude prices today would cut one-half a percentage point off OECD GNP growth, boost unemployment by some 500,000 persons, and add slightly more than one-half a percentage point to inflation, besides adding to the already severe balance-of-payments problems of many nations.

But the adjustment may be gradual, with a series of moderate price hikes. Oil prices are apt to rise in the next several years in any event, because OPEC countries want to improve their terms of trade which have deteriorated under the impact of world inflation and dollar depreciation. Prices are particularly likely to begin rising as perceptions of a possible supply problem spread. (Secret Noform-Nocontract-Orcon)

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EGYPT: FAVORABLE TERMS FOR FOREIGN OIL COMPANIES

Egypt's success in boosting oil output in recent years reflects the highly competitive financial terms that Cairo provides to foreign oil companies. A 1973 decision to open up new areas for foreign oil exploration and development via production-sharing agreements has attracted some 30 oil companies. Cairo's cautious, almost conciliatory approach toward the companies reflects Egypt's dependence on foreign expertise, equipment, and financial resources to find and develop its oil. It also recognizes the risk factor implicit in the Arab-Israeli conflict and in the Israeli occupation of parts of the Gulf of Suez where the most promising oil concessions are located. Cairo hopes increased oil exports during the next several years will reduce Egypt's dependence on foreign aid.

Relations With Foreign Oil Companies

Relations with foreign oil companies date back to the early years of this century when Egypt was under British rule. From the time oil was discovered in the Gulf of Suez area in 1908 until the Suez crisis in 1956, the Anglo-Egyptian Oilfields Company—majority ownership held by Shell with a minority holding by the Egyptian Government during the latter part of the period—was the major operator in Egypt.

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The Suez crisis led to an Egyptian takeover of the firm's fields late in 1956 and the creation of the Egyptian General Petroleum Corporation (EGPC) in 1957. This government corporation was given the responsibility for overseeing all aspects of the petroleum industry. Egypt's go-it-alone attitude kept relations between Egypt and the foreign oil firms unsettled until the early 1960s.

In an attempt to increase oil discoveries and production, the EGPC in 1963 turned to foreign firms and established fifty-fifty joint ventures with AMOCO, Phillips, and ENI. In the late 1960s, additional concessions were granted, some on a fifty-fifty production-sharing basis. The 1967 Arab-Israeli war and the intermittent hostilities that followed, however, limited foreign oil company activities and interest. As late as 1972, only a few companies were involved in the Egyptian oil sector. Furthermore, only 160,000 square kilometers had been covered in exploration agreements. The most important was the EGPC-AMOCO joint venture in the Gulf of Suez (known as GUPCO), where the largest oilfield—El Morgan—was discovered in 1965.

While Egypt showed slow progress in the 1960s compared with other oil-producing countries, the EGPC gained valuable experience and confidence in dealing with foreign oil companies. It was able to develop a favorable operating climate despite the general Egyptian distrust of foreign firms. In large part this was due to the realization by Egyptian leadership that successful development of the oil sector required the presence of Western firms and a minimum of bureaucratic interference. Accordingly, the foreign firms had to deal only with the EGPC and were not bothered by the restrictions and delays that confront most foreign businesses operating in Egypt.

Shift in Oil Policy

The 1973 decision to make large areas available for foreign exploration and development was based on concern over production declines at the El Morgan field and an awareness that foreign expertise, equipment, and financial resources would be required to reverse the downward trend in output. President Sadat's belief that Western firms should be allowed a greater role in Egyptian economic development was a contributing factor. Cairo also decided at this time to use production-sharing agreements exclusively for new concessions and to renegotiate existing joint ventures. By yearend 1977, 46 new agreements had been signed with some 30 foreign companies; these agreements covered an additional 480,000 square kilometers and included the remaining offshore tracts in the Gulf of Suez.

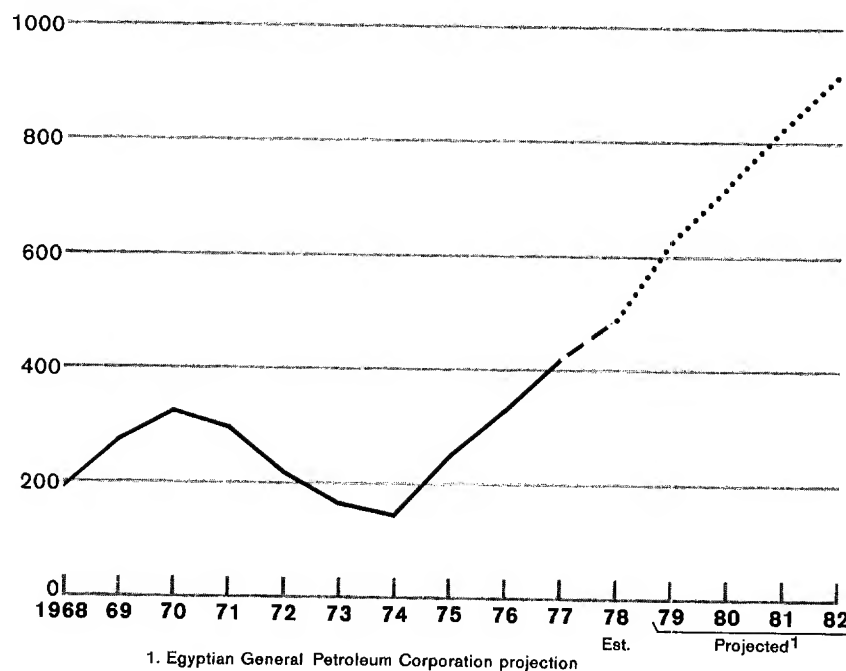
Most of the production-sharing contracts last for 20 years after the startup of production and can be extended for 10 years at the option of the foreign company. Under the agreements:

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- The foreign company pays a signature bonus and all exploration, development, and production costs.
- The company also guarantees a minimum exploration investment in the area of the concession and agrees to pay bonuses if specified production and reserve levels are attained.
- Up to 40 percent of output is set aside to reimburse the foreign company for current operating expenses, exploration costs (usually repaid over five years), and development costs (usually repaid over 10 years).
- After deducting for costs, the company receives a fixed share of the remaining oil (usually from 15 to 20 percent depending on the agreement) and the EGPC receives the rest.

Egypt: Oil Production

Thousand b/d



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Egypt: Example of a Production-Sharing Agreement

Company	AMOCO
Location	100 square kilometers in the Gulf of Suez, south of Ras Gharib
Date of agreement	July 1974
Signature bonus	\$3 million
Exploration guarantees	\$2 million through July 1976
Development	During exploration, the EGPC and AMOCO will establish a joint consultative committee. After commercial discovery, a joint company will be established to carry out further exploration and development with AMOCO financing development expenditures.
Production-sharing	Up to 40 percent to AMOCO for current operating expenses, exploration costs spread equally over five years, and development costs spread equally over 10 years. The remaining oil split 80:20 between the EGPC and AMOCO.
Production bonuses	\$1 million to the EGPC when production reaches 50,000 b/d. \$1 million to the EGPC when production reaches 100,000 b/d. \$3 million to the EGPC when production reaches 200,000 b/d.
Reserve bonuses	\$700,000 to the EGPC when reserves reach 50 million barrels. \$700,000 to the EGPC when reserves reach 75 million barrels. \$600,000 to the EGPC when reserves reach 100 million barrels.

Foreign Company Benefits

The production-sharing agreements are considered profitable from the firm's point of view. The primary advantage is that the firm receives its share of production after costs regardless of what happens to oil prices. If oil prices rise, then the value of the company's share also rises, unencumbered by taxes or royalties. Furthermore, if operating costs rise, these expenditures remain covered without the firm having to resort to lengthy negotiations.

An illustration of returns to foreign oil companies operating in Egypt lists AMOCO's take from each barrel of GUPCO production in 1976. The cost of production in 1976 reportedly averaged \$1.36 per barrel (including prorated exploration and development costs)—well below the 20-percent share allocated to cover costs in the GUPCO production-sharing agreements. AMOCO's 17-percent share of production was worth an estimated \$1.69 after production costs for every barrel produced—higher than the return per barrel to foreign companies in neighboring Middle East countries and competitive with returns to foreign companies in other non-OPEC oil-producing countries.

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Egypt: Estimated Breakdown of GUPCO (EGPC-AMOCO) Oil,
1976

Item	Dollars per barrel
1. Estimated price.....	11.30
2. Production costs (Up to 20 percent of item 1 reimbursed to AMOCO)	1.36
3. AMOCO's share of oil after costs (17 percent of item 1 minus item 2)	1.69
4. EGPC's share of oil after costs (83 percent of item 1 minus item 2)	8.25

While production costs at the GUPCO fields are slightly lower than at other existing fields in Egypt and almost certainly will be lower than those in the new fields currently under development, the new fields will operate under concessions that provide up to 40 percent of production to cover costs and frequently provide 20 percent of production after costs to the foreign firm. Although signature and other bonuses cannot be counted against costs, these relatively small, one-time fees will be more than covered from the oil company's share of aftercost production if oil finds are large enough to develop.

Egypt's Benefits

The major advantage to Egypt from the production-sharing agreements is that Cairo neither bears any of the financial risks of exploration nor has to finance development if oil is found. Competitive financial terms, good prospects for new discoveries, and the global search in the early 1970s to find new oil supplies all helped generate interest in Egyptian concessions. The 46 agreements signed in 1973-77 yielded signature bonuses of \$95 million and provided guaranteed exploration investment of \$826 million. These new agreements and the cessation of hostilities between Egypt and Israel caused foreign exploration expenditures to increase steadily after 1974, totaling \$622 million in 1974-77. Similarly, exploratory drilling activity in 1975 reversed a downward trend.

Impact on Discoveries and Production

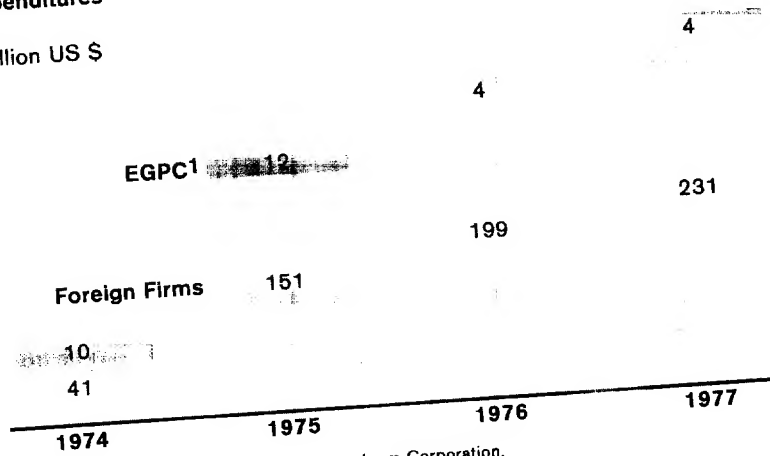
The result of this activity has been the discovery of several new oilfields. The first important finds—July (1973) and Ramadan (1974)—were both located in the GUPCO tract in the Gulf of Suez, which also contains the large El Morgan field. Development of the two new fields enabled Egyptian oil production in 1975 to reverse the downward slide that started in 1971 because of declining pressure at the El Morgan field and was exacerbated by the 1973 Arab-Israeli war. By 1977, oil output had climbed to 420,000 b/d with 70 percent coming from the three GUPCO fields.

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Egypt: Oil Exploration

Expenditures

Million US \$

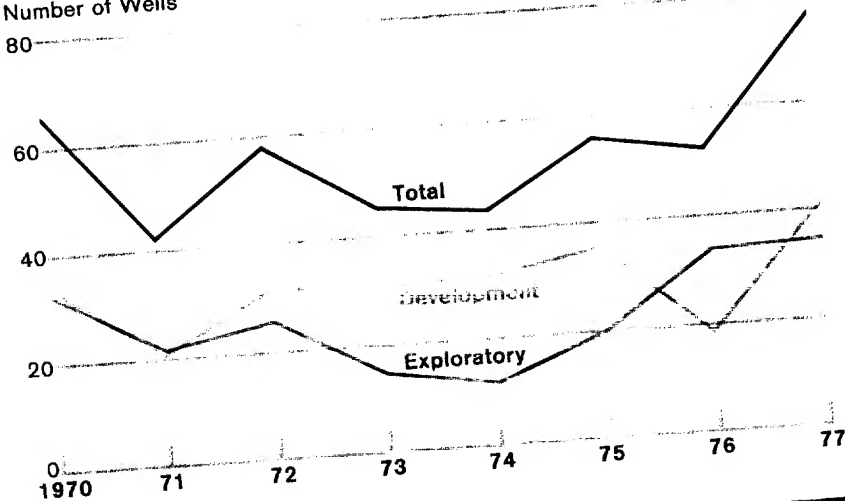


1. Egyptian General Petroleum Corporation.

Drilling Activity

Number of Wells

80



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Discoveries in the new concession areas since 1973 are only starting to produce. The major new discoveries—all in the Gulf of Suez—include:

- AMOCO's Block 382 discovery in late 1975, which started production in late 1977.
- AMOCO's Block 300 discovery in 1976, which also began production late in 1977.
- DEMINEX's (a West German firm) discovery west of the El Morgan field in 1976.
- AMOCO's Block 195 discovery in 1977.
- DEMINEX's discovery early in 1978 in the North Belayim concession held jointly with Shell and BP.

Outlook

Development of new discoveries and investment in existing fields will boost Egyptian oil production in the next several years. Cairo originally hoped to produce 1 million b/d in 1980, but this goal has been set back to 1982 and may remain elusive. The key determinants will be the quantity of new discoveries, the rate of development and the status of the Arab-Israeli dispute.

Tension with Israel is the most important negative factor overhanging the Egyptian oil sector. Israel occupies most of the Sinai Peninsula and controls the Gulf of Suez adjacent to the occupied territories. AMOCO is the most seriously affected firm. Access to part of its South Belayim and South Gharah concessions (the latter purchased for a record signature bonus of \$12 million in 1974) is denied by Israeli forces. It is in AMOCO's South Gharah concession that Israel discovered the Alma field in November 1977 and started production in March 1978. AMOCO exploratory drilling rigs operating in the parts of its concessions adjacent to the Israeli-controlled area have been harassed by Israeli gunboats, but the Israelis have not interfered with production. While AMOCO and the Egyptian Government have protested the Israeli interference, they have not yet initiated legal action that would attempt to secure compensation. Elsewhere in the Gulf of Suez, the Israeli military presence is not as directly threatening. But the ever-present possibility of hostilities obviously serves to retard the growth of oil output to some degree. (Confidential)

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OPEC: RECORD-LEVEL BORROWING

We estimate that OPEC members will borrow more than \$13 billion in international capital markets* this year, about double the amount borrowed in 1977. An estimated \$17 billion decline in the OPEC current account surplus for 1978 is encouraging many members to borrow while they still have a relatively high credit rating and while liquidity in capital markets remains ample. The need for the more populous states—Algeria, Indonesia, Iran, Nigeria, Venezuela—to finance ambitious internal development plans also continues to be a dominant motivating factor.

Borrowing High in 1977

In 1977, private foreign borrowing by OPEC members rose almost \$3 billion, to a record \$6.8 billion, in part because of a simultaneous decline by \$3 billion in the combined current account surplus. Venezuela, the largest OPEC borrower in both 1976 and 1977, saw its current account go into deficit near the end of last year. Among other populous OPEC states, Iran and Algeria also turned to international capital markets to finance internal development projects, particularly those associated with the petrochemical industry.

OPEC: International Borrowings ¹

	Million US \$				
	1974	1975	1976	1977	1st Half 1978 ²
Total	824.5	3,211.3	3,842.7	6,761.7	7,140.5
Algeria	61.3	535.0	809.8	641.2	1,086.0
Ecuador	0	55.0	70.0	435.9	140.0
Gabon	57.0	45.0	118.8	56.0	78.0
Indonesia	367.5	1,625.0	509.6	87.7	743.5
Iran	114.5	245.0	961.9	1,841.5	798.2
Iraq	0	500.0	0	0	0
Kuwait	0	0	20.0	46.0	77.0
Libya	0	0	0	0	25.0
Nigeria	25.0	0	0	0	1,300.0
Qatar	0	0	0	350.0	100.0
Saudi Arabia	0	0	36.6	136.7	86.7
UAE	151.0	6.3	187.0	1,079.0	764.0
Venezuela	48.2	200.0	1,129.0	2,087.7	1,942.1

¹ Preliminary.

* As used in this article, borrowing consists of confirmed loan or bond commitments. The term "international capital markets" covers medium- and long-term bank loans and bonds received from private financial institutions in developed countries.

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International borrowing of more than \$1 billion by the United Arab Emirates (primarily Dubai, Sharjah, and Ras al Khaimah) was a significant change in the borrowing pattern of the less populous OPEC members with current account surpluses. Much of UAE borrowing was for nonoil-related industrial development. Kuwait, Qatar, and Saudi Arabia secured loans from commercial sources to avoid drawing down reserves when faced with short-term cash flow problems.

Further Borrowing Surge in First Half 1978

First half 1978 borrowing by OPEC states exceeded total borrowings in 1977. In first quarter 1978, borrowing soared to more than \$4.5 billion—almost three times larger than in the previous quarter. Surprisingly strong borrowing continued through the second quarter, totaling more than \$2.7 billion.

Several factors have encouraged larger borrowing this year: (a) the drop in oil export volume, (b) a continued rise in import volume, (c) deterioration in terms of trade, and (d) high liquidity of major banks. The OPEC export surplus is projected to fall to about \$48 billion in 1978, down nearly \$16 billion from 1977. Almost 65 percent of OPEC imports last year were capital equipment and intermediate industrial goods, primary ingredients in OPEC countries' drive to develop modern economies. Given the uncertainty of projected oil revenues, OPEC states have turned to private capital markets as a source of long-term financing, especially in the current borrowers market that is characterized by strong competition among banking institutions. Nearly all the loans and bonds are transactions by OPEC governments or quasigovernment entities with West European, Japanese, and, less importantly, Middle Eastern banks.

OPEC: Foreign Trade and Current Account Balances

	Billion US \$				
	1974	1975	1976	1977	1978 ¹
Trade balance	82.9	50.6	63.1	63.6	48.1
Exports f.o.b.	118.0	108.2	131.1	146.6	143.4
Imports f.o.b.	35.1	57.6	68.0	83.0	95.3
Current account balance	72.8	31.1	36.9	34.0	17.1

¹ Estimate.

Outlook for the Next Six Months

We expect the rate of OPEC borrowing in second half 1978 to roughly match the first six months of the year. Based on projected credit needs and loans under negotiation, we estimate that borrowing by OPEC countries will range between \$13

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and \$16 billion this year, considerably more than the \$8 to \$9 billion estimated by OECD.* A further shrinking in the composite current account surplus—to about \$6.6 billion in the second half of 1978—will continue pressure on OPEC to tap foreign capital markets rather than curtail domestic investment programs. Trends in credit ratings and requirements vary widely among individual members.

OPEC: Credit Ratings, Current Account Balance,
and Estimated International Borrowings

Credit Ratings ¹	Million US \$			
	Current Account Balance		1978 International Borrowings	
	1977	1978 (Estimated)	Low	High
Total	34,044	17,131	12,900	15,800
Above Average (AAA-AA)				
Iran	5,848	3,742	2,000	2,500
Kuwait	4,395	5,319	140	200
Qatar	827	832	200	300
Saudi Arabia	15,393	7,987	160	200
Venezuela	-313	-2,956	3,000	3,400
Average (A-BA)				
Algeria	-3,153	-3,359	2,100	2,500
Iraq	3,475	2,465	0	0
Libya	3,333	2,544	100	300
Nigeria	-1,032	-2,725	2,500	3,000
UAE ²	4,748	3,746	1,300	1,500
Below Average (BBB-B)				
Ecuador	-762	-715	300	500
Gabon	-52	-292	100	100
Indonesia ³	1,337	543	1,000	1,300

¹ Credit ratings have been obtained [REDACTED] using Moody's categories. The above-average category corresponds roughly to a current Euromarket spread over LIBOR of 5/8 of a point or less; 5/8 to 1-1/4 points would be average; below average is 1-1/4 points or more.

² Abu Dhabi contributes about 60 to 70 percent to the federations' budget and has an above-average credit rating. Dubai's credit rating is below average: it currently pays more than 1-1/4 points over LIBOR for loans.

³ Indonesia's credit rating is almost certainly higher now, reflecting settlement of the Pertamina problem.

Algeria has a rising debt service ratio, a policy of limiting the number of foreign financial advisers, and costly capital development projects—factors that have increased the cost of borrowing. Its credit rating is further eroded by a continuing current account deficit of more than \$3 billion and a decline in international monetary reserves to about \$2.6 billion. A recent \$2.8 billion in Eurocredit loans,

* OECD does not break out OPEC countries separately in their "oil exporters" category. The amount borrowed by Trinidad and Tobago, Bahrain, Oman, and Brunei in the oil exporting countries group is small.

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issued to help finance two gas liquefaction plants at Arzew, carried a margin of 1-3/8 percentage points over LIBOR,* a relatively high spread. Demand for investment in liquefied natural gas and related tanker projects remains strong, but Algeria will have difficulty maintaining its borrowing pace if capital markets tighten.

Indonesia improved its balance-of-payments situation in 1977, reducing its demand for new loans. At the same time, settlement of a legal dispute over Pertamina's tanker obligations improved Jakarta's ability to borrow funds on private international markets. Much of the \$744 million borrowed in first half 1978 went to refinance earlier high-cost borrowing. Jakarta placed a 10-year, \$5 million yen-denominated bond at 7-1/2 percent on the Japanese capital market in July, an indication that Indonesia's credit is improving. Government officials are interested in loans that would be tied to long-term development projects.

Iran is expected to borrow heavily for internal development projects and will continue to be viewed as an attractive borrower by international bankers. Iranian Government entities borrowed slightly less than \$800 million in the first half of 1978. Informed sources expect additional large borrowings by development credit institutions and some private companies to cover costly investment in the national air transport system and construction of the Iran Gas Trunkline II pipeline. Aggregate Iranian borrowing is projected to exceed \$2 billion in 1978.

Nigeria is in the market for another \$1 billion loan following a successful placement of a like amount earlier this year. The Nigerian Development Bank has been authorized to borrow for specific industrial projects. Nigeria's demand for external financing is fueled both by a slump in oil earnings and large cost overruns. Even though its current account deficit is expected to run about \$2.7 billion in 1978, bankers still view Nigeria as a good credit risk. [REDACTED]

[REDACTED] the second \$1 billion loan may be increased to \$1.2 billion.

UAE member states, with the exception of Dubai, look to Abu Dhabi for financial support. Dubai has borrowed heavily for construction of an aluminum smelter, docks and drydocks, enlarged port facilities, and development of a larger economic infrastructure. The UAE is expected to borrow for the development of the hydrocarbon-based industry concentrated in Ruweis. The individual Emirates have expensive industrial projects under construction. The UAE will be a candidate for additional loans, in spite of an estimated current account surplus of about \$3.7 billion in 1978.

* London Inter-Bank Offer Rate.

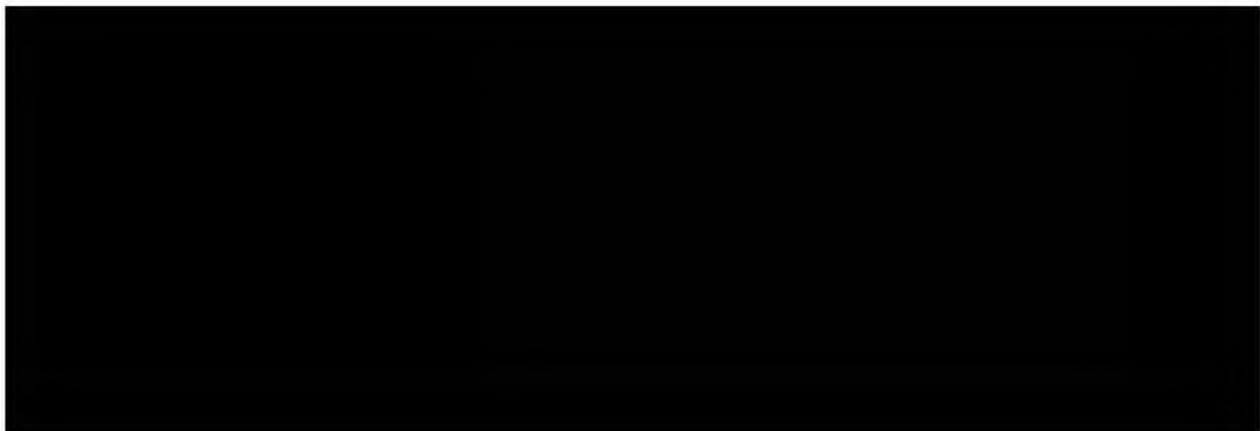
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Venezuela has an excellent credit rating, despite an expected \$3 billion current account deficit this year. Borrowing in the first half of the year amounted to nearly \$2 billion, with most of the funds destined for public works under the fifth national plan. In June, the Venezuelan Development Corporation, a government agency, raised \$58 million at $\frac{3}{4}$ of a point over LIBOR. Venezuela is expected to borrow between \$3 and \$3.4 billion in 1978.

Ecuador and *Gabon*, with their below-average credit ratings and sizable current account deficits, are expected to borrow only moderate amounts for specific projects. Ecuadorean officials claim that domestic inflationary pressures and the political unpopularity of foreign loans preclude new foreign borrowings. Gabon is negotiating a \$80 million loan, primarily to purchase a Boeing 737 aircraft and to provide working capital for the Trans-Gabon Railway. Despite its large debt burden and low credit rating, Gabon has received a \$78 million French loan.

Iraq, Kuwait, Libya, Qatar, and Saudi Arabia will have a combined current account surplus estimated at \$19.1 billion this year. Kuwait, Qatar, and Saudi Arabia have excellent credit ratings. Bankers will still lend to Iraq and Libya but are concerned about the political situation. We expect the combined borrowing of these five countries to total less than \$1 billion in 1978. Surplus countries have an interest in borrowing to establish credit records and gain experience in the international capital market. Iraq is considering refinancing at more favorable rates the unpaid balance on a previous \$500 million loan. (Confidential)

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